

Innovative High Temperature Acoustic Liner Development and Modeling, Phase I

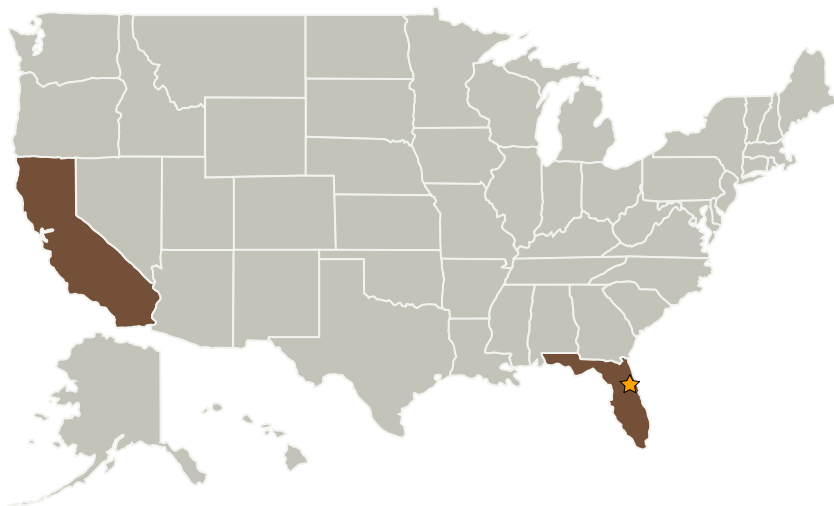
Completed Technology Project (2004 - 2005)



Project Introduction

The massive acoustic loads produced by launch vehicles can detrimentally affect the proper functioning of vehicle components, payloads, and launch support structures. The high-velocity and high temperature rocket engine exhaust stream mixes with ambient atmosphere to generate intense acoustic loads, which account for the majority of structural vibration during launch. Ultramet has developed a unique, high temperature material that has demonstrated passive broadband sound attenuation over a range of frequencies and can withstand temperatures in excess of 1650 C (3000 F). In this project, Ultramet proposes to team with the Graduate Program in Acoustics at Pennsylvania State University (PSU) to develop and test a scale model to validate the impedance of this novel high temperature acoustic liner. An innovative, porous acoustic material will be developed that has demonstrated thermal, corrosion, acoustic, and mechanical load resistance at high temperatures, and porosity, pore size, pore shape, and material of construction will be varied to optimize mechanical and acoustic performance over a wide range of frequencies, amplitudes, and gas flow velocities and temperatures. Ultramet and PSU will also develop a basic numerical model to aid in the design of an economical and efficient liner exhaust duct system.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Kennedy Space Center (KSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Kennedy Space Center(KSC)	Lead Organization	NASA Center	Kennedy Space Center, Florida
Ultramet	Supporting Organization	Industry	Pacoima, California

Primary U.S. Work Locations	
California	Florida

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX13 Ground, Test, and Surface Systems
 - └ TX13.1 Infrastructure Optimization
 - └ TX13.1.1 Natural and Induced Environment Characterization and Mitigation